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Texture mapping 3D models of real-world scenes

Frederick M. Weinhaus, Venkat Devarajan

December 1997 ACM Computing Surveys (CSUR), Volume 29 Issue 4

window

Full text available: pdf(1.98 MB)

Additional Information: full citation, abstract, references, index terms, review

Texture mapping has become a popular tool in the computer graphics industry in the last few years because it is an easy way to achieve a high degree of realism in computergenerated imagery with very little effort. Over the last decade, texture-mapping techniques have advanced to the point where it is possible to generate real-time perspective simulations of real-world areas by texture mapping every object surface with texture from photographic images of these real-world areas. The techniqu ...

Keywords: anti-aliasing, height field, homogeneous coordinates, image perspective transformation, image warping, multiresolution data, perspective projection, polygons, ray tracing, real-time scene generation, rectification, registration, texture mapping, visual simulators, voxels

2 Light field rendering

Marc Levoy, Pat Hanrahan

August 1996 Proceedings of the 23rd annual conference on Computer graphics and interactive techniques

Full text available: pdf(376,59 KB) Additional Information: full citation, references, citings, index terms

Keywords: epipolar analysis, holographic stereogram, image-based rendering, light field, vector quantization

3 3D multimedia environments: Computation and performance issues In coliseum: an immersive videoconferencing system



H. Harlyn Baker, Nina Bhatti, Donald Tanguay, Irwin Sobel, Dan Gelb, Michael E. Goss, John MacCormick, Kei Yuasa, W. Bruce Culbertson, Thomas Malzbender

November 2003 Proceedings of the eleventh ACM international conference on Multimedia



Full text available: pdf(824.55 KB) Additional Information: full citation, abstract, references, index terms

Coliseum is a multiuser immersive remote teleconferencing system designed to provide collaborative workers the experience of face-to-face meetings from their desktops. Five cameras are attached to each PC display and directed at the participant. From these video streams, view synthesis methods produce arbitrary-perspective renderings of the participant and transmit them to others at interactive rates, currently about 15 frames per second. Combining these renderings in a shared synthetic environm ...

Keywords: telepresence, videoconferencing, view synthesis

Three-dimensional medical imaging: algorithms and computer systems M. R. Stytz, G. Frieder, O. Frieder



December 1991 ACM Computing Surveys (CSUR), Volume 23 Issue 4

Full text available: pdf(7.38 MB)

Additional Information: full citation, references, citings, index terms, review

Keywords: Computer graphics, medical imaging, surface rendering, three-dimensional imaging, volume rendering

5 QuickTime VR: an image-based approach to virtual environment navigation Shenchang Eric Chen



September 1995 Proceedings of the 22nd annual conference on Computer graphics and interactive techniques

Full text available: pdf(347.59 KB) Additional Information: full citation, references, citings, index terms

Keywords: environment maps, image registration, image warping, panoramic images, real-time display, view interpolation, virtual reality

6 Plenoptic sampling



Jin-Xiang Chai, Shing-Chow Chan, Heung-Yeung Shum, Xin Tong
July 2000 Proceedings of the 27th annual conference on Computer graphics and interactive techniques

Full text available: pdf(11.97 MB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> <u>terms</u>

This paper studies the problem of plenoptic sampling in image-based rendering (IBR). From a spectral analysis of light field signals and using the sampling theorem, we mathematically derive the analytical functions to determine the minimum sampling rate for light field rendering. The spectral support of a light field signal is bounded by the minimum and maximum depths only, no matter how complicated the spectral support might be because of depth variations in the scene. The minimum sampling ...

Keywords: image-based rendering, plenoptic functions, plenoptic sampling, spectral analysis

7 The pixel machine: a parallel image computer

Michael Poimesil, Eric M. Hoffert

July 1989 ACM SIGGRAPH Computer Graphics, Proceedings of the 16th annual conference on Computer graphics and interactive techniques, Volume 23 Issue 3





Full text available: pdf(3.12 MB)

Additional Information: full citation, citings, index terms

8 <u>Session P12: approximation and compression: Real-time decompression and visualization of animated volume data</u>



Stefan Guthe, Wolfgang Straßer

October 2001 Proceedings of the conference on Visualization '01

Full text available: pdf(1,52 MB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> terms

Interactive exploration of animated volume data is required by many application, but the huge amount of computational time and storage space needed for rendering does not allow the visualization of animated volumes by now. In this paper we introduce an algorithm running at interactive frame rates using 3d wavelet transforms that allows for any wavelet, motion compensation techniques and various encoding schemes of the resulting wavelet coefficients to be used. We analyze different families and o ...

Keywords: compression for visualization, time critical visualization, volume rendering

The holodeck ray cache: an interactive rendering system for global illumination in nondiffuse environments



Gregory Ward, Maryann Simmons

October 1999 ACM Transactions on Graphics (TOG), Volume 18 Issue 4

Full text available: pdf(935,74 KB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> terms

We present a new method for rendering complex environments using interactive, progressive, view-independent, parallel ray tracing. A four-dimensional holodeck data structure serves as a rendering target and caching mechanism for interactive walk-throughs of nondiffuse environments with full global illumination. Ray sample density varies locally according to need, and on-demand ray computation is supported in a parallel implementation. The holodeck file is stored on disk and ...

Keywords: illumination, image reconstruction, mesh generation, ray tracing, rendering system, virtual reality

10 The lumigraph

Steven J. Gortler, Radek Grzeszczuk, Richard Szeliski, Michael F. Cohen

August 1996 Proceedings of the 23rd annual conference on Computer graphics and interactive techniques

Full text available: pdf(334.72 KB) Additional Information: full citation, references, citings, index terms

¹¹ Fast perspective volume rendering with splatting by utilizing a ray-driven approach Klaus Mueller, Roni Yagel

October 1996 Proceedings of the 7th conference on Visualization '96

Full text available: pdf(1.33 MB)

Additional Information: $\underline{\text{full citation}}, \underline{\text{references}}, \underline{\text{citings}}, \underline{\text{index terms}}$

12 An anti-aliasing technique for splatting

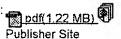
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J. Edward Swan, Klaus Mueller, Torsten Möller, Naeem Shareef, Roger Crawfis, Roni Yagel October 1997 Proceedings of the 8th conference on Visualization '97





Full text available: additional Information: full citation, references, citings, index terms

Keywords: anti-aliasing, direct volume rendering resampling, perspective projection, reconstruction, splattering, volume rendering

13 The RACE II engine for real-time volume rendering

Harvey Ray, Deborah Silver

August 2000 Proceedings of the ACM SIGGRAPH/EUROGRAPHICS workshop on **Graphics hardware**

Full text available: pdf(785.19 KB)

Additional Information: full citation, abstract, references, citings, index terms

In this paper, we present the RACE II Engine, which uses a hybrid volume rendering methodology that combines algorithmic and hardware acceleration to maximize ray casting performance relative the total amount of volume memory throughput contained in the system. The challenge for future volume rendering accelerators will be the ability to process higher resolution datasets at over 10Hz without utilizing large-scale, and therefore, expensive designs. The limiting performance ...

14 Efficient image-based methods for rendering soft shadows

Maneesh Agrawala, Ravi Ramamoorthi, Alan Heirich, Laurent Moll

July 2000 Proceedings of the 27th annual conference on Computer graphics and interactive techniques

Full text available: mpdf(11.36 MB)

Additional Information: full citation, abstract, references, citings, index terms

We present two efficient imaged-based approaches for computation and display of highquality soft shadows from area light sources. Our methods are related to shadow maps and provide the associated benefits. The computation time and memory requirements for adding soft shadows to an image depend on image size and the number of lights, not geometric scene complexity. We also show that because area light sources are localized in space, soft shadow computations are particularly well suited to im ...

Keywords: image-based rendering, raytracing, shadows

15 Dynamically reparameterized light fields

Aaron Isaksen, Leonard McMillan, Steven J. Gortler

July 2000 Proceedings of the 27th annual conference on Computer graphics and interactive techniques

Full text available: pdf(2.82 MB)

Additional Information: full citation, abstract, references, citings, index terms

This research further develops the light field and lumigraph image-based rendering methods and extends their utility. We present alternate parameterizations that permit 1) interactive rendering of moderately sampled light fields of scenes with significant, unknown depth variation and 2) low-cost, passive autostereoscopic viewing. Using a dynamic reparameterization, these techniques can be used to interactively render photographic effects such as variable focus and depth-of-field within a li ...

Keywords: autostereoscopic displays, depth of field, frequency domain analysis, image-

h



based rendering, light field, lumigraph, multitexturing, ray space analysis, synthetic aperture

16 Session P7: volume visualization II: A new object-order ray-casting algorithm Benjamin Mora, Jean Pierre Jessel, René Caubet October 2002 Proceedings of the conference on Visualization '02



Full text available: pdf(2.41 MB)

Additional Information: full citation, abstract, references, index terms

Many direct volume rendering algorithms have been proposed during the last decade to render 2563 voxels interactively. However a lot of limitations are inherent to all of them, like low-quality images, a small viewport size or a fixed classification. In contrast, interactive high quality algorithms are still a challenge nowadays. We introduce here an efficient and accurate technique called object-order ray-casting that can achieve up to 10 fps on current workstations. Like usual ray-c ...

Keywords: medical imaging, ray tracing, scientific visualization, volume rendering

17 Surfels: surface elements as rendering primitives Hanspeter Pfister, Matthias Zwicker, Jeroen van Baar, Markus Gross July 2000 Proceedings of the 27th annual conference on Computer graphics and

interactive techniques Additional Information: full citation, abstract, references, citings, index Full text available: pdf(500.97 KB)

Surface elements (surfels) are a powerful paradigm to efficiently render complex geometric objects at interactive frame rates. Unlike classical surface discretizations, i.e., triangles or quadrilateral meshes, surfels are point primitives without explicit connectivity. Surfel attributes comprise depth, texture color, normal, and others. As a pre-process, an octreebased surfel representation of a geometric object is computed. During sampling, surfel positions and normals are optionally pert ...

terms

Keywords: rendering systems, texture mapping

18 An audio input-output computer system for medical information Michael Otten, Scott I. Allen, Perry Plexico, William C. White August 1969 Proceedings of the 1969 24th national conference

Additional Information: full citation, abstract, references, citings, index Full text available: pdf(754.84 KB) terms

An experimental telephone-based input-output system, using low-cost audio response equipment, was implemented on a medium-sized real-time computer. This system enables update of audio vocabulary files from a remote telephone terminal, which is a major feature simplifying program and data base modification. Speech signals are processed with an analog-to-digital converter at the rate of 10,000 samples per second, compressed by a delta modulation program to one bit per sample, and stored on a ...

19 Ray space factorization for from-region visibility Tommer Leyvand, Olga Sorkine, Daniel Cohen-Or July 2003 ACM Transactions on Graphics (TOG), Volume 22 Issue 3

Additional Information: full citation, abstract, references, index terms Full text available: Repdf(6.26 MB)

From-region visibility culling is considered harder than from-point visibility culling, since it is inherently four-dimensional. We present a conservative occlusion culling method based on factorizing the 4D visibility problem into horizontal and vertical components. The visibility of

the two components is solved asymmetrically: the horizontal component is based on a parameterization of the ray space, and the visibility of the vertical component is solved by incrementally merging umbrae. The tec ...

Keywords: PVS, dual space, hardware acceleration, line parameterization, occlusion culling, visibility

20 Modeling and manipulation: Real-time volume manipulation

V. Singh, D. Silver, N. Cornea

July 2003 Proceedings of the 2003 Eurographics/IEEE TVCG Workshop on Volume graphics

Full text available: pdf(479.03 KB) Additional Information: full citation, abstract, references

In this paper, we describe a set of algorithms and an implementation (called VolEdit), for interactively manipulating 3D volumetric objects (datasets). The system utilizes skeletons, which allows users/animators to interactively and intuitively specify the location and type of deformation desired. The skeleton is extracted automatically from the volumetric model and indexes the appropriate part of the volume that needs to be transformed by defining piecewise bounds of the volume. The deformed vo ...

Keywords: animation, bounding boxes, deformation, manipulation, mid-plane geometry, skeleton, texture mapping

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